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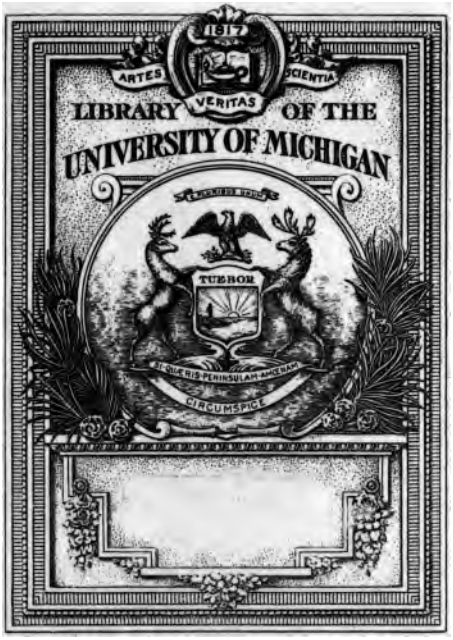
PHYSICAL STANDARDS FOR BOYS AND GIRLS

BY

CHARLES K. TAYLOR, M. A.



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THE GIFT OF
Rev. H. A. Jump.

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The most perfect boy, physically, in 5,500. A fifteen-year Stuyvesant High School (New York City) pupil, who began, at 12, with a poorly-developed, flabby physique, with a score of about 78, and attained 150 in three years.

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Physical Standards for Boys and Girls

A handbook for the use of school
physical directors, medical inspectors,
Boy Scout leaders, and parents.

by

Charles K. Taylor, M.A.

Director of the Department of Standards, Carteret Academy,
Orange, N. J. Author of "Character Development",
"Physical Examination and Training", etc.

THE ACADEMY PRESS
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CHAPTER ONE

THEORY

The tables of measurements contained in this hand-book are based on the anthropological fact that there is more than one normal type of human physique. This, of course, does not agree with the popular theory that there is only one normal type of build, and that this is the general average of all builds. On this theory we have tables of average weights for children of different heights and ages, with the emphasized statement that those who range in weight less than 7 per-cent below the general average for their age and height must be sub-normal in some manner, possessing malnutrition, perhaps, or other ill or defect.

Now these tables have been gained through an immense amount of very praiseworthy effort. Children have been weighed by the thousand in order to gain the averages. And as averages they are exceedingly authoritative. Not only so, but by the circulation of these tables throughout the country, with much very valuable propaganda against malnutrition and other remediable ills and defects, a great deal of effective attention has been directed towards the problems concerning nutrition generally, and as concerns the school-child in particular, to the great benefit of the child.

But by focussing attention on those who happen to be under the 7 per-cent limit of weight-difference already mentioned, we are actually unjust in two cases. That is, we are apt to class as physically subnormal children who are normally and healthily slender, and whom no feeding of any rational kind would make any heavier, unless it be considered desirable to produce merely "fat" children. Besides judging physically sub-normal children who are normally and hereditarily slender, we also are apt to ignore the fact that a child may be up to average weight, and still be subnormal physically. Such a child may have serious defects, and may even have malnutrition, and yet be safe within the 7 per-cent limit. Yet this child, by the average weight standards, would be judged favorably, while the healthy, slender child would be dubbed "under-weight," and perhaps be given an unhealthy interest and an anxiety in his or her weight for which there would be no justice or reason. Not only so, but the average-weight child, or even the child that is over the average-weight, may have a miserable physical development, be flabby, may lack stamina, and possess far less health-stamina than the wiry, active, slender child.

And that brings us to a definition of "under-weight." This term is so often used that we will do well to make its definition clear. The popular meaning, fostered by tables of average weights that have been sent broadcast, is this:—

A child is "underweight" if his or her weight is more than 7 per-cent below the general average weight for the same age and height.

We oppose that definition strenuously. It neglects the fact that it is as normal for some to be slender, and others to be stocky, as for still others to come somewhere between these two extremes. Therefore, we suggest this definition:— A child is "underweight" when his or her weight is below what it should be FOR THAT INDIVIDUAL'S TYPE OF BUILD. How can you tell, then, by comparing a child's measurements with those given in tables of standards whether there is "underweight" or not? You can not. You can judge whether a child is underweight or not only by means of a medical examination. If such an examination, carefully done, results in a judgment that a child has malnutrition, or some other serious ill or defect, then you can well believe that the child's weight is below what it should be FOR THAT CHILD'S TYPE OF BUILD. If, however, the medical examination finds no serious fault, if the child is shown to possess good health and has a reasonably well developed physique, then you may feel assured that the child's weight is correct for that child's type of build, whether the child be slender or stocky, or near the general average.

Unfortunately it is too customary to judge merely by a child's weight. So it is we find whole towns stating that a third of their children have "malnutrition," or that they are "underweight" or the like, while the fact is that they did nothing but weigh the children, and found, as was to be expected, that there was a wide variation, from slender to stocky.

It is time, therefore, that we refuse to accept a mere weight comparison in lieu of a medical examination. Let us insist on a medical examination for each child, with proper measures for all that suffer from curable or improvable ills and defects. Child-welfare workers, medical examiners, and school nurses will find that they have fewer slender children to care for, but that they will find many among the average weight, or over-weight, seriously needing attention, so that their hitherto magnificent work will have even a broader scope than before!

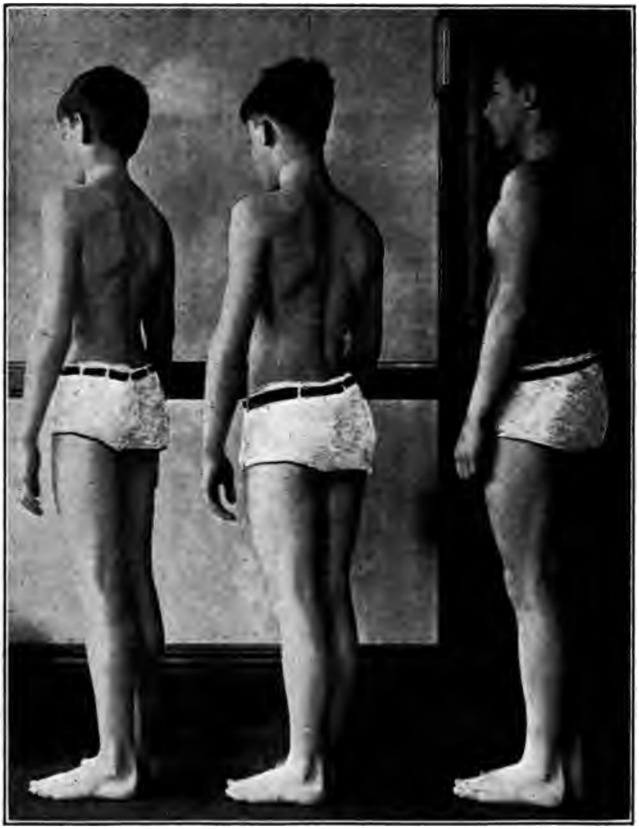
Let us make emphatic, then, what should be the first step when we decide to take an effective interest in the physical well-being of the children in a school, or in a school system. Let us insist on a medical examination for each child, and on this examination let us base our judgments as to malnutrition and other ills, and let us remedy all ills and defects as rapidly as possible. There is no need to detail such matters. The medical and nursing staffs connected with our schools are becoming increasingly more competent.

Then for the next step. When children are found healthy, or made reasonably healthy, we should see to it that they are given a muscular development corresponding to their type of build. The value of a strong musculature is greater than many suppose. It not only impels the possessor into beneficial exercise, but there seems to be a relationship between physical and mental efficiency. Here is an example—without going into complicated coefficients of correlation. A few years ago the writer calculated the physical standards, according to the method herein described, of the boys in The Speyer School, an experimental public school run jointly with Teachers College, New York City. 159 boys were taken into one grade, and these 159 divided into 7 classes, on a basis of intelligence, this latter judged through the most painstaking intelligence tests and corrected by class-room experience. The most intelligent class was called "A1," the next "A2." and so on, down to "A7." In A1 over half of the class had the hundred physical standard or better. In A7 not one boy came to 100. The writer has found a similar result in studying all the boys of 13 years in a large public school. They were distributed from the 8B grade down to 4A. And although there were exceptions, as a general rule the higher the grade the higher the physical score—as might be expected. Now it is very true that bright school children are sometimes found, who make splendid "reports" for a while, and who obviously are miserably developed. But these are the exception. The effective mentality, in the long run, seems to go with the effective physique. Furthermore, the writer in many cases has observed a class-room improvement following a marked increase in physical score.

One more note on the same subject. The Singerley (public) school, of Philadelphia, tried out the height-weight system for two years. At the end of that time the principal reported not only a markedly better behavior record in that school, but the highest percentage of promotions in the history of the school. The average physical score, in the two years, had increased from 93 to 99.

In general, it is probably very safe to claim that there is a relationship between mental and physical efficiency, and, not only so, but very probably between physical efficiency and character stamina. The writer has observed some very remarkable transformations of character coming with the development of a flabby muscular development into a hard and efficient one. The very expression of the face seems to change, taking on firmer and stronger lines.

But outside these particular reasons, well developed muscles are valuable in themselves, making their possessor more ready to meet many emergencies requiring physical fitness and rapid co-ordination, and stimulating their owner to take part in out-door games and sports that mean so much for health and all-around development.



A Slender, Medium, and Heavy Type boy. Not one has a physical flaw, each one representing an hereditary family type. This being so, would it not be absurd to judge the first and third boys by the standard set by the second one?

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Yet it is amazing how few schools and how few school systems are effectively interested in physical development. It is likely that we have all been paying so much attention to mere weight that development has been seriously neglected. Yet development is far too important a matter to leave to chance. It is worthy of our most serious attention. Let us, therefore, bother a good deal less about the weight of healthy children, but see to it, as we have said, that they are given a physical development proportional to their type of build.

One great fault of the general average idea is that it provides a standard impossible of attainment, not only to the normally slender, but also to the normally stocky. True it is, we are rather inclined to stuff the one and to starve the other, in a completely hopeless attempt to force them to change their hereditary types of build and approximate the average. But there is no reason to believe that even this average is ideal. The statistician of the Metropolitan Life Insurance Company assured the writer that it is the slender, the so-called "underweight," who are the longest lived!

It is unfair, then, to compare the measurements of children with standards that are impossible for them to approximate. The only fair judgment, then, is in comparison with an attainable and satisfactory standard for the same type of build.

The tables of standards contained herein are arranged on this basis. That is, they provide for five grades of build, ranging from slender to stocky or "heavy." They represent nearly twelve years of study. Over 5000 healthy boys alone were studied and measured and their measurements ranged into the tables.* The tables for girls are based on a smaller number of individual measurements, and so are not as satisfactory as the writer would like to have them. They have been given thorough trial, however, and subsequently gained data will make little change, and, as with the tables for boys, they will be found very illuminating in obtaining a judgment as to a girl's physical development.

As healthy children only were used, the measurements run a little over the general average, as might be supposed. But then the writer sees no reason for making the average the ideal. It is well to strive, in physical development, for something better than the average, and the writer made it a special point to incorporate into the tables measurements of as many particularly well developed children as he could find. So, though the measurements given are over the average, they are quite attainable for children of the various types, and so provide a goal that is not an impossible one, as is the general average standard both for the normally under-average and normally over-average weights.

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*Tentative tables were first published in the American Magazine, and then, successively, and constantly improving, in two books "The Physical Examination and Training of Children," John C. Winston Co., and "The Boys' Camp Manual," Century Co.

CHAPTER TWO

STANDARDIZING BOYS

Few medical examiners and physical directors realize in full the effect upon a boy of being measured. This process alone is a great stimulus toward an interest in physical development and training. It doubtless goes back to the primitive desire to be strong.

Measuring a boy, then, is the first step in developing an effective interest. The next step is to use the love of competition that is an innate quality, and one that can be used in many ways as a direct aid in worth-while educational matters. There are some, of course, who decry competition in any form. It is just as sensible to condemn many wholly innocent games merely because they can be used for gambling purposes. Some competitions are doubtless undesirable, but a competition in things that are worth while brings out the very best exertions and often high qualities of character. Life itself is a competition of the most serious kind, and those who would bring up a boy unacquainted with competition in any form might prepare him for some far distant, lovely and etherial existence, but he would not be prepared for this world!

We are used, of course, to competitive effort in sports, and this must be handled with care.

But an immense amount of good can be done by putting physical improvement on a competitive basis, and this is something that can be done by the height-weight method of scoring.

It is the custom of many schools where physical measurements are taken, to send home, every spring, reports concerning the increases in those measurements, and term them "gains." Now a boy may have increased all over and may have lost in physical development instead of gained. It has, however, been exceedingly difficult to separate increases due to mere growth from those due to actual improvement. This is something that can be done through the height-weight system.

When a boy is taller and heavier after a period of time has gone by, then all of his other measurements must have increased in proportion if he is to have even the same score he started with, because of his growth in height and weight he will be judged by a proportionally higher standard than before. The requirements for all the other measurements have increased in proportion to his height-weight gains. If, however, the boy's score has actually increased, then you know that some or all of these other measurements have increased BEYOND that required by proportional growth, and you have an actual improvement registered.

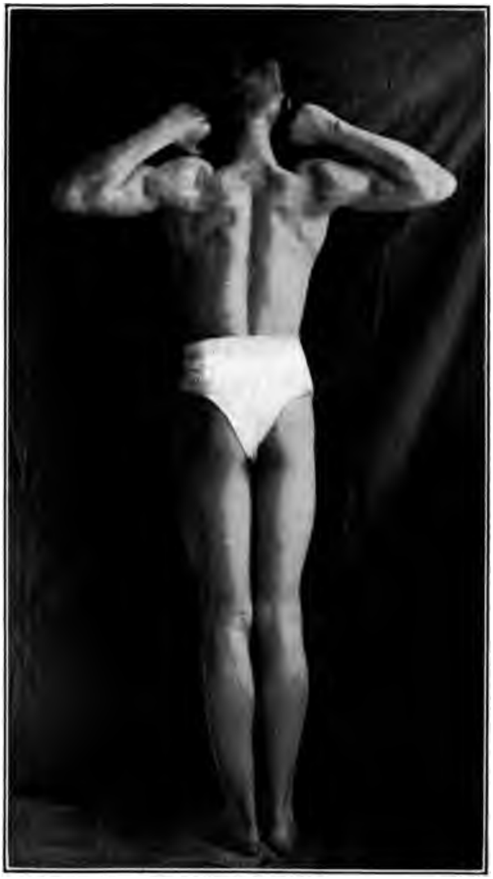
This, then, makes possible two competitions in a school, or between schools. The strong boys, who could not improve very much, no matter what they did, can compete for the highest score, and the boys with the worst physiques have the best chance in the "improvement" competition, the per-cent of gain being the determining factor. That is, a boy may begin with the low score of 75 and increase to 90. This would give him a gain of 20 per-cent, a very fine gain indeed. The writer has seen a gain of over 40 per-cent during a school year.

It helps materially to maintain interest if boys who have measurements below standard can report, at fairly frequent intervals, and see if they have made up the deficiency, or at least see if they are gaining. With the above competitions instituted, and with frequent reports made possible, amply sufficient interest is aroused to keep the great majority of deficient boys steadily at work, and they will do their special exercises at home, faithfully, for months at a time! Few except physical trainers would believe how great an interest can be aroused by so simple a process, how easily it can be maintained, and how effective in results, not only physically, but in other important ways.

The writer saw, a few years ago, an amazingly interesting competition of this kind, between four public schools of a large city. The judge was Dr. R. Tait McKenzie, Physical Director of the University of Pennsylvania. In each school the five boys having the highest score were on hand, with hundreds of their school-mates to cheer them. The event was held in a fortunately very large Y. M. C. A. gymnasium. The first five boys stood in a row, stripped, and Dr. McKenzie selected the boy with the best development, explaining in what ways he was superior to the other four. Five boys from the second school stood before him, and again the best one of the five was selected. A complete silence reigned among the great crowd of school-boys present, and a round of hand-clapping when the best developed boy of each five was chosen. Finally Dr. McKenzie had before him four boys, each one the best in his own school. The juvenile audience broke loose with cheers and stampings as Dr. McKenzie finally selected the best one of the four—as fine a looking specimen of boyhood as could be imagined—an 8B grade boy of thirteen.

Does one have to detail the effect of such an exhibition and of such competitions in the schools themselves? The principals of the schools concerned commented not only on the steady interest in physical training, and its effect upon smoking—which was given up, and corner-lounging—which gave place to hiking, and upon other and worse failings, but also the excellent effect on the tone of the whole school, and even a marked effect upon the routine class-room work.

It might be feared that such a program, however fine, might require the services of too many instructors. This is not the case. After



A wonderfully developed 13-year boy (Medium Type) who won an inter-grammar-school "best physique" competition, with a score of 135, the judge being Dr. R. Tait McKenzie, of the University of Pennsylvania.

Height, 61 inches; weight, 97 pounds. The ideal is not over-development, but sufficient and symmetrical development.

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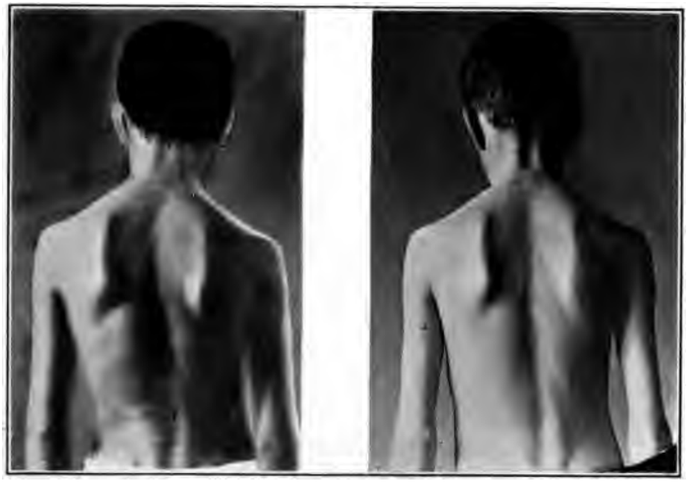

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This 12-year boy, stimulated by photograph competition, and fairly frequent measuring, carried on simple exercises at home, and made the indicated improvement in about 5 months.

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the boy has had his medical examination, and is given his physical score, all the instructor has to do, usually, is to describe what exercises will aid in removing the "minuses" and in converting them into "plusses." The boys will do the rest at home. They will want to do it. And they will do it effectively. This, of course, does not apply so thoroughly to corrective work of a more serious nature. Exercises in such cases must be prescribed by specialists. We are referring particularly to exercises that may be done by the boys in order to bring their physical development up to a satisfactory standard for their height and weight.

THE TABLES

The tables will be found arranged for five gradations of build, ranging from slender to heavy. There could well be other tables filling in between each pair of these, but in a great majority of cases these bring the height-weight combinations very close to those of a great majority of boys.

Let it be emphasized that these tables are for use with children who are healthy. When a child has malnutrition, or other ill serious enough to affect weight and general well-being, then it is likely that the child's weight is not correct FOR THAT CHILD, so the first step is to remove all causes of ill-health. Only when this is done should we plan to bring the development of a child to what it should be.

Besides muscular development the matter of posture must receive much consideration. Now very often a bad posture is the result of a weak muscular development, and all the talking in the world will not help very much. Development of the muscles involved, however, will often have the desired effect, and this, plus the stimulus of not too frequent remark and, particularly, an occasional exhibition of a good and bad example of posture, will accomplish the desired end.

Another very strong appeal to a boy to work for a better posture and a better all-around development is gained through the profile photograph. A number of schools have had great success through the use of this adjunct. The plan is to photograph all the boys in a school, wearing no more than running-pants or tights, taking the profile view, and then posting them all where the boys can see them and compare them. The writer has found it good economy to take six or seven boys at a time on a 5 by 7 plate.

The result is that boys having bad posture, or inadequate development, or both, are seriously annoyed to see what they look like when compared with boys of good posture and development. It appeals directly to a strong primitive desire to be strong, and is very effective in developing a real ambition to be physically perfect. It has been found very effective, too, to re-photograph boys who have made marked improvement, and to replace their old photograph with the new one. Frames can be made cheaply which allow the rapid insertion and removal of individual photographs.

So much for the general theory of the height-weight system, and for the means that can be used to arouse and maintain an interest in physical development. It might be mentioned briefly that the interest thus aroused gives the physical trainer, the medical inspector, and the principal of the school, an influence of great strength that can be used very effectively in making appeals for moral cleanliness and good habits generally. It is extremely likely that sex-hygiene teaching in schools does much more harm than good. It is based on a false theory—the theory that a knowledge of "facts" will affect behavior. It will do nothing of the kind. The drunkard knows all the "facts" against his drinking, and the thief all the "facts" against his stealing, but the one will drink and the other steal until their ideals change. A boy will be morally decent if he is given high ideals. And a thorough interest in physical training, backed by steady and rational participation in out-door games and sports, will make unnecessary any worry concerning morals. Ideals and physical training are the solution!

A physical trainer who believes his work concerns nothing but physical training is losing sight of one of his greatest fields of usefulness. Because of the interest a normal boy takes in such work, that of the physical trainer can be an influence of unusual power, one that can be used very definitely and directly in aiding a boy to develop good habits, to abandon bad ones, and to work towards healthy, self-respecting manhood and good citizenship!

It is not the province of this handbook to take up the question of games and sports, but this point must always be emphasized—there is far more benefit in a variety of out-door games and sports, rationally managed, than in all the indoor gymnastics and basket-ball in the world. It is true that boys are likely to specialize in one kind of out-door sport, and this may be one not bringing a well-rounded development, and, too often, physical directors are likely to let the general good suffer for the sake of a winning first team. Nor are the physical directors always to blame, for often, no matter how well the director brings along the great majority of his boys, his reputation, if not his very position, depends on what he does with the one team. And this despite the great deal of open criticism that has been made on the subject.

Unfortunately, for the great mass of city school children there is little possibility of any general acquaintance with the best out-door sports, and restricted school-yards present few possibilities. But even these must be used, and games appropriate for narrow quarters utilized, so that at least some organized open-air play can *be brought* to aid in the all-around physical *development of* children.

CHAPTER THREE

STANDARDIZING GIRLS

In general, the same theories apply to the standardization of girls that apply to boys. We must first assure ourselves of the girl's health before we can attempt to obtain a reliable physical score.

Several important factors come into play, when the physical training of girls is considered, which do not affect that of boys—or at least to a very small degree.

First of all, the average girl is not interested in physical development. To be strong does not appeal nearly as much as her appearance. To be sure, this is beginning to give way, particularly in high schools and private schools, because of the increasing interest that older girls are taking in athletic sports. And this latter is encouraging, for it shows that there is no inherent reason why a girl should not be given an interest in muscular development, and the present lack of interest is, likely enough, the result of custom and lack of opportunity. And the writer has known girls as young as twelve to be very aggressively interested in such matters, and to start a process of training that was carried on for two or three years with a steadiness that resulted in a splendid physical development.

In general, however, it takes time to arouse a general interest of this kind, and such a matter as physical measuring can usually be taken up only after a year or two of education and encouragement. It can be done, however, with excellent results, as the records of some high schools and private academies show.

It is well, then, unless you are very sure of your group, not to begin a physical measuring process off hand, without warning and an educational process planned to arouse interest in the subject. Under ten years there are no difficulties to speak of, and it may be considered good policy to begin with the younger ones and continue the process with their group and the succeeding ones as they pass through the school, and the very fact of such a procedure taking place with younger girls is apt to influence the older ones favorably.

Different methods apply to different kinds and types of schools and to different kinds of communities. It is here that the judgment of the principal must decide.

The second important factor concerns the standards themselves. The plan cannot be as simple as that which serves well for boys and young men. For instance, suppose a girl is 54 inches tall. She may be pre-adolescent, adolescent, or post-adolescent. Her age cannot always help in judging which. Very obviously a set of standards suitable for pre-adolescent girls will not do *at all for physic*ally mature girls of the same height, or even of the same height and age. The whole type of build has changed markedly.

So, if we can use five sets of standards for boys, ranging from slender to heavy, we must use at least ten sets of standards for girls, allowing five each for the pre-adolescent and post-adolescent. We might even provide a third set of five for the adolescent stage, though in practice we find that the two sets do quite well, and these two sets are given in this handbook.

With girls the question of posture is much more serious than with boys. Not only does the average girl's lack of exercise have its effect, and the way many girls have of curling up the same way on chairs and lounges, but many purposely take a slouching posture as a kind of pose. But a girl can be appealed to very strongly if she is shown conclusively the effect of bad posture on appearance, and this can be done by actual example, or even by photographs. As with boys, however, if the proper muscles are developed—if the muscles of the back, abdomen, and across the shoulders are made hard and firm, a girl or boy will tend to assume a good posture. Posture is so important a matter in many ways that in school competitions for best build, posture should be made to count, too, so that in the case of two contestants with the same score the one with the better posture should be given the award.

With girls, as with boys, the interest in competition can be used to a worth while degree, even if not with so strong an effect—competitions for best build, for the benefit of those already strong, and for highest per-cent of improvement, for those of poor build.

As with boys, the physical director can come to a close relationship with a girl and can be of immense aid during the trying years of a girl's development, not only physically, but mentally and morally.

CHAPTER FOUR

ORGANIZATION

A school organization, of whatever size, should provide both for an experienced medical examiner and a physical trainer. This is a most serious proposition in rural schools, it is true, though here and there rural districts are combining forces, and with the use of motor busses, children from quite a large area are able to attend first class schools, and such schools can make adequate provision for such matters. The small, one-room rural school, however much it may need such attention, is too often largely dependent on the gratuitous aid of some good-natured physician and on such physical training as the one teacher can give. The handicaps under which such schools labor, are, however, receiving more and more attention, so that before long it may become a prevalent custom to have medical inspectors and physical trainers who, by automobile, can care for quite a large area.

Too often, when a school is fortunate enough to have both a medical inspector and a physical director, there is too little co-operation between the two. The physical director should not only have access to, but be very familiar with, the records made by the physician, for very often the special exercises and the sports and games have to be modified very much to fit the needs of children who are laboring under various difficulties, some of which would not be obvious to the physical director. In such hard driving games as basket-ball, and in running events, an intimate knowledge of the medical records is vitally necessary. Basket-ball particularly has an evil record when used by children of the fast-growing age. No boy or girl should play it at all unless the heart is absolutely sound, and even then the play should be limited to very short periods, with frequent rests. This game requires a maximum of sustained effort and is the cause of no little heart enlargement.

Again, medical examiners often find faults that may be remedied at home, through changing or improving the diet, by giving a child more sleep, or something of the kind. These faults are too often recorded by the examiners—and then nothing is done about it. Fortunately, here and there, the school nurse has become a real and effective institution, and where they are we can be more sure of a co-operation between the medical examiner, the school and the home, making for a rapid elimination of remediable ills and a much higher percentage of children who are in good health.

It is to be remembered that the use of the height-weight system of standards depends on this very matter—the bringing of all children as near as possible to a perfect health standard first. The medical examination is absolutely essential, and as we have said before, it is essential for all children, whatever their type of build may be, from slender to heavy.

The recommendations of the medical examiner being followed, then, and the physical director being acquainted with the medical records, the measuring of the children can be carried out with some significance. When schools are co-educational, as most lower schools are, then the combined efforts of trained men and women are both needed to gain the measurements and physical scores of the boys and girls. The records should be kept on individual blanks where, under the measurements of the child, can be placed the standard measurements for the same height and weight, and, under that, the points added or subtracted depending on whether the child's measurements go above or below the standard. The child is given 100 to start with. With boys shoulder-girth, upper arm girth, chest-girth and calf girth have ¼ inch counting one point. Chest expansion and the difference in girth of the upper arm when contracted count 1 point for each ⅛ of an inch above or below standard. With hips and thighs ½ inch counts 1 point. With girls the same scoring is used, only that with hips and thighs 1 inch counts a point.

When the scores are found, it is effective to have the scores of all the children in the school posted where they can see them, and after each score should be indicated just where the minuses were gained. This helps the child to focus attention to particular needs, and also aids in awakening the spirit of emulation. After this is done, periods can be set when a child can report for exercises that will aid in getting rid of the minus quantities. We cannot take up in full a series of such exercises. The writer has already done so in a previous text-book. But a few suggestions may be found useful.

The best exercises for making up deficiencies are those which require a concentration of the mind on the exercise. An exercise that will do this will be more effective than weights, dumbbells, or other apparatus. Such exercises are the so-called "resistance" movements, which require that one set of muscles be opposed by another set.

SPECIAL EXERCISES.

For instance, here is a powerful exercise for developing biceps and triceps. Place the hands, palm to palm, in front of the chest, with the right palm, say, facing outward. Force the right hand straight outward, then, against a firm and steady resistance of the left hand. Resist strongly, yet allow the right hand to go outward so that the right arm is out at full length in about two seconds. Then have the left hand push the right hand back to the chest again, slowly and resisting strongly. When a boy is doing this, *have him* notice how the right triceps and left biceps are being used. Then reverse the hands, when fatigue begins, and push outward with the left hand. Now the left triceps and right biceps are obviously being used. The beauty of this and similar exercises is that only by concentrating the mind on the exercise can there be any resistance. And so it is that the writer has found it exceedingly effective, with girls as well as boys, in bringing up the various minus quantities.

Following the same theory—clench the fingers of the hands together, raising the elbows at each side the height of the shoulders, then let the right hand pull the left one over to the right as far as possible, then let the left hand pull the right one over to the left as far as possible. Continue till fatigue begins. This will be found to affect strongly the muscles across the shoulders. Here is another, helpful when the shoulders stoop forward over a flattened upper chest. Clench the fists in front of the chest and raise elbows to the height of the shoulders. Now slowly, resistingly, move the fists upward and backward, back past the ears and close to them. Then relax and bring them forward to the front of chest again. Repeat until fatigue begins. It will be observed with such exercises that they bring about much less heart-strain than is the case with the more violent exercises commonly in use.

For chest expansion the writer suggests a slight modification of the usual breathing exercise. Here it is: First count—raise arms straight over head. Second count—take a full breath, as full as possible. Third count—retain air and bring arms down to side in relaxed position. Fourth count—exhale. It has been found that when this is done 16 to 20 times, three times a day, low chest expansions are readily improved.

For a minus in calf-girth, it is effective to walk a block, each day, without letting the heels touch the ground. This, of course, is not a resistance exercise of the first type, but as fatigue is likely to begin rather soon with it, it takes real mental effort to maintain it for the block. Physical directors will think of variations of the resistance exercises to fill the various needs.

When all the children who have minuses have reported, and have had special exercises assigned to them, they can be told how soon they may report to learn if they have "gained." This is an essential means for sustaining interest, and sustained interest means physical improvement. At this time, too, the principal of the school can announce the two competitions—the one for physical improvement and the other for highest score. This latter can become a matter for inter-school competition. One such competition has been described. This is one that would appeal most strongly to boys, and would doubtless be difficult to organize for girls. In the inter-school competition for best-build, the five boys having the five highest scores would represent a *school,* let us say, and the judge would select the best built boy of all, counting not only the boys' physical scores, but their posture, their symmetry, and possibly even details such as the shape of foot. The writer remembers seeing a competition among boys for the best shaped foot, and they learned more about the effect of badly shaped shoes and pointed toes than they had ever dreamed of. And this is a competition that would benefit girls more than boys, for most boys like comfortable shoes, with plenty of room, and are rather more proud of wearing large shoes than the reverse!

Besides working for physical improvement only, the physical scores can be used in other ways. For instance, some schools think it a mistake to give honors solely for class-room work, and feel that they should go to the all-around boy rather than to the scholastic grind only, or the lesson-hating athlete only. So it is that honors might include the physical score, or the per-cent of improvement, as well as a boy's athletic spirit and his good comradeship.

The general theory being now described, and the machinery for carrying it out, we can now come to the actual process of gaining the physical standards.

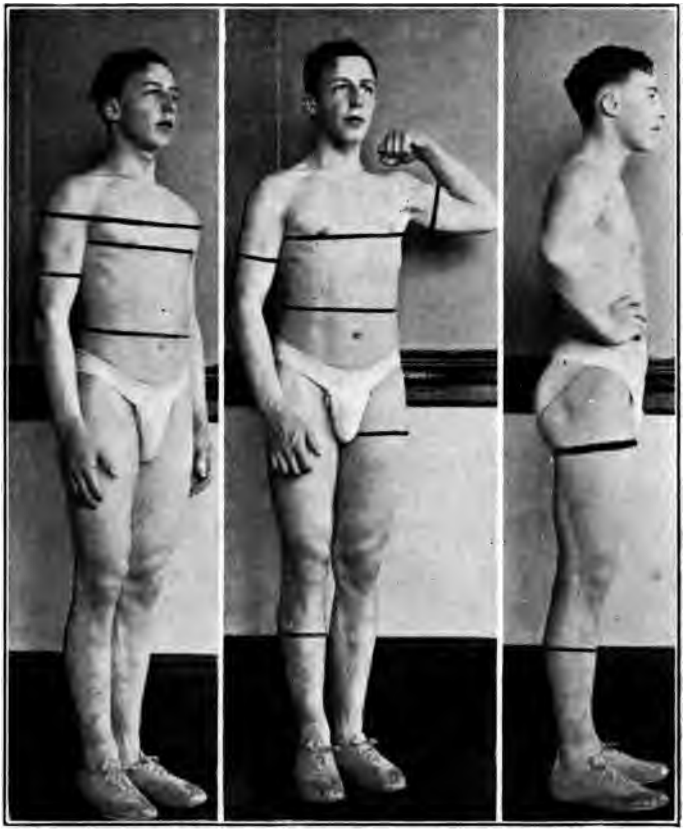
CHAPTER FIVE

THE STANDARDIZING

MEASURING. Use a tape that will not stretch. Steel is preferable. In measuring hold lightly. There is a tendency to pull tightly on a tape, and as the flesh is easily compressible, it is possible to take an inch or more from some measurements without realizing it at all, and when inches count points it is a serious matter.

Hold the tape lightly then and just firmly enough to prevent it from slipping down. By looking at the part being measured you can readily see if the tape is compressing the flesh in the least. It is highly essential that these directions be followed to the letter. Any individual variation to any marked degree will make the comparisons with the standards less valuable. Fortunately it is a simple matter, first—to hold the tape lightly so as not to compress the flesh in the least.

The second important point is that in measuring shoulder-girth, upper arm girth, hip, thigh, and calf girth, the maximum girth must be taken. In taking the shoulder girth it is necessary to see the arrangement of the tape both from front and from side, to be sure that it includes the greatest possible girth—taken at the widest part of the shoulders.



The black lines show where the tape for the various measurements is to go.

(Boy's score 115, heavy type, age 14.)

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In measuring the upper arm have the boy or girl raise the arm horizontally. Then measure the upper arm over the biceps. Then have the biceps contracted as fully as possible and measure at the point of maximum girth. The difference between the first and second measurements is the "difference" mentioned in the tables.

CHEST-GIRTH. There is less uniformity in taking chest-girth and chest-expansion than with any other measurement. It is taken at different places, some take the girth with the chest relaxed, and the "expansion" is the difference between that and the full breath. We have found that the relaxed position is not always the same with the same person, even with immediately successive measurements. This is especially true when children become self-conscious. To have measurements we can rely on we must find fairly fixed qualities, and those that can be altered only by growth or special training. Our "chest-girth," then, means the chest with the air exhaled—a maximum exhalation. With the boy the measurement is taken about an inch below the arm-pits; with the girl at the 9th rib.

When taking this measurement place the tape lightly in position, taking care not to pull it tightly. Tell the child to take a big breath—as big as possible. Note the measurement. Then tell the child to breathe all the air out—ALL the air. See that the child does not aid expansion or contraction by movements of shoulders. Make it a natural breathing—but a maximum and minimum one. When maximum exhalation is reached, note the girth and put that down as "chest-girth," and the difference between this one and the first measurement—the maximum inhalation—is the "chest expansion" of the tables. This takes practice, of course, but measuring after a time becomes almost automatic, only see to it that it becomes correctly so.

WAIST. This is the minimum measure. See that the subject does not hold the abdomen in—making a small measure. Take it relaxed. This measurement does not count in the scoring, but it aids in understanding a score if the subject has a minus for nearly all girths, in which case you are likely to find an excessively large waist-measure. This again may mean an unhealthy fatty condition, or it may mean that a flattened chest—caused itself by some breathing obstruction like adenoids—is forcing the abdomen out unnaturally.

HIPS. Maximum measurement. Here, as with shoulders, it is necessary to view from front and side.

THIGHS. Maximum—to crotch and just under hip-muscles. Hip and thigh measurements are not as significant as others, and so are given less value.

CALF. Maximum. This can usually be seen from the side, though a glance front and side makes for accuracy. In our scoring, we take average of thighs and calves and count twice.

SCORING.

Find the table that shows a weight nearest to that of the subject for the same height, taken in whole inches. That is, we do not count fractions of an inch in height. When the weight comes half way between the weights given for the same height in two tables, compare the subject's weight with the measurements going with the lighter weight. If the child is a typically "fat" child, no score can be made. This is not a normal type.

Start with a score of 100. As the individual's measurements go above or below standard for the same height and weight, points are added to or subtracted from 100.

With shoulder-girth, upper arm girths, chest-girth, and calf-girth, ¼ inch counts a point. With the "difference" in measurement of upper arm on contraction of biceps, ⅛ inch counts a point. With chest-expansion ⅛ inch counts a point. With hips and thighs, ½ inch counts a point for boys, and 1 inch counts a point for girls. Less than ½ of a point is not counted.

Here is an example. The upper row shows the measurements of a boy. Below them are the standard measurements for a boy of approximately the same height and weight. Below that are the respective "plusses" and "minuses," according to whether the measurements are above or below the standard. And finally there is the "score," which is gained, remember, by adding or subtracting the sum of the plusses and minuses from 100.

60	92	35⅝	28½	3½	8½	1½	8	1¼	25	30	19	12¼
		35⅞	28⅛	3½	8¼	1½	8	1¼	25¾	30⅝	18⅝	12
		−1	+1½		+1					−1	+1½	+2

Adding minus and plus quantities we have +4. 100+4=104.

A score of 104 is very satisfactory. The boy has no conspicuous minus quantities, and those he has can be made up in two or three weeks. A girl would be scored the same way, only it is to be remembered that with girls with hip and thigh differences from standard 1 inch counts a point.

Remember, too, to take the average of thighs and calves and count twice, as is shown in the above example.

And remember, too, that this scoring is really worth while with healthy children, and not so much with children who have malnutrition or other serious ill.

WHAT CAN BE LEARNED FROM THE SCORES

The final score gives a boy or a girl an opportunity to gain a fair comparison between his or her muscular development and an ATTAINABLE and satisfactory standard for the same type of build. On the printed record blanks, which are arranged so that the scores can be put down as in the example, the individual can see just where he or she has fallen below standard, and so will know just which points need special exercise, and the *physical* director can advise in this matter. It aids much, after that, if the individual is enabled to report, at reasonable intervals, to see if the deficiencies are made up. Some are made up very rapidly.

The final score has another and very important use. By means of taking successive scores real improvement can be distinguished from mere growth gains. It is too common to term these latter "improvement." When an individual is taller and heavier, all the other measurements must improve in proportion in order to maintain the first score. Mere growth will not bring up a score. If, however, the score actually increases, then some or all of the other measurements must have improved more than was necessary for proportional growth, and you have an actual IMPROVEMENT registered. This is a very significant matter, and a great aid in checking up the value of a course of training, it being thus possible to find if actual improvement follows its use. This, perhaps, is the most valuable achievement of this system.

BOYS
Slender Build

Hght.	Weight	Shoulder Girth	Chest Girth	Chest Expansion	Right Arm	Difference	Left Arm	Difference	Waist	Hips	Thighs	Calves
51	54	28½	22½	2¾	6¼	⅞	6	¾	19½	23¼	14	9½
52	56	28¾	23	2¾	6½	⅞	6¼	¾	19¾	23¾	14½	9¾
53	58	29⅜	23¼	2¾	6⅝	1	6⅜	¾	20	24	15	10
54	59	29⅞	24	2⅞	6⅝	1⅛	6⅜	⅞	20	24½	15⅛	10¼
55	62	30½	24½	3	6¾	1⅛	6½	1	20½	25¼	15⅜	10½
56	65	31¼	25	3⅛	7	1¼	6¾	1	21	26½	15½	10¾
57	67	31⅞	25¼	3¼	7¼	1¼	7	1⅛	22	27	15⅞	10¾
58	69	32⅛	25⅞	3⅜	7⅜	1⅜	7¼	1⅛	22¾	27½	16⅜	10⅞
59	73	32⅝	26⅛	3⅜	7⅝	1⅜	7⅜	1¼	23	27⅞	16¾	10⅞
60	77	33	26½	3½	7¾	1½	7½	1¼	23¼	28¼	17¼	11
61	82	33⅝	26⅝	3½	7¾	1½	7½	1¼	24	28½	17½	11⅛
62	87	34¼	26¾	3½	7⅞	1½	7⅝	1⅜	24¾	28⅞	17⅞	11¼
63	93	35	27½	3⅝	8	1⅝	7¾	1⅜	25½	29⅜	18¼	11½
64	100	35⅝	28⅛	3⅝	8⅛	1¾	7¾	1⅜	25¾	30	18¾	11¾
65	110	36¼	28¾	3¾	8¼	1¾	7⅞	1½	26⅛	31	19¼	12
66	115	37	29¼	3¾	8½	1⅞	8⅛	1½	27	32¼	19¾	12½
67	120	38	30	3¾	9	2	8½	1⅝	27⅝	32⅞	19⅞	13
68	124	38⅞	30½	3⅞	9	2	8⅝	1⅝	28	33½	19⅞	13
69	129	40	31½	4	9¼	2¼	8⅞	1¾	28½	34½	20½	13⅛
70	133	40¾	32½	4	9⅜	2¼	9	1⅞	29⅛	35	20¾	13⅛
71	140	41½	33¾	4⅛	9¾	2¼	9¼	2	30	35¾	21	13¼

BOYS
Slender-Medium Build

Hght.	Weight	Shoulder Girth	Chest Girth	Chest Expansion	Right Arm	Difference	Left Arm	Difference	Waist	Hips	Thighs	Calves
51	56	29½	23½	2¾	6⅜	⅞	6¼	¾	20	25	14⅞	10⅛
52	59	29¾	23½	2⅞	6⅝	1	6¼	¾	20⅜	25⅜	15¼	10⅜
53	61	30¼	24⅜	2⅞	6¾	1⅛	6½	⅞	20⅞	26	15⅝	10½
54	63	30¾	25	2⅞	7	1⅛	6¾	⅞	21	26¼	15¾	10¾
55	67	31⅞	25¼	3	7⅛	1¼	6⅞	⅞	21⅝	27	16⅛	10⅞
56	70	32⅞	25⅝	3⅛	7⅜	1¼	7	1	22⅛	27¾	16⅜	11
57	72	33⅜	26	3¼	7½	1¼	7¼	1	22⅞	28	16¾	11⅛
58	76	33¾	26⅞	3⅜	7⅝	1⅜	7¼	1⅛	23½	28¼	17¼	11¼
59	80	34	27	3⅜	7⅞	1⅜	7⅜	1⅛	24	28½	17½	11⅜
60	83	34½	27¼	3½	8	1½	7¾	1¼	24½	29¼	17⅞	11½
61	88	34⅞	27⅜	3⅝	8⅛	1½	7¾	1¼	25⅛	29¾	18¼	11⅝
62	93	35⅝	27½	3⅝	8¼	1½	8	1¼	25¾	30½	18⅝	11¾
63	99	36	27¾	3¾	8⅜	1⅝	8	1⅜	26⅜	31¼	19	12
64	108	36⅝	28⅛	3¾	8½	1⅞	8⅛	1½	26¾	32¼	19⅜	12⅛
65	115	36⅞	28⅜	3⅞	8¾	1⅞	8⅜	1½	27	32⅞	19⅞	12½
66	121	37⅝	29½	3⅞	8⅞	2	8½	1⅝	27¼	33¼	20⅛	12⅝
67	127	38½	30¼	3⅞	9¼	2	8¾	1¾	28	33¾	20⅛	13¼
68	135	39⅜	31¼	4	9¼	2⅛	8¾	1⅞	28⅝	34	20¼	13¼
69	140	40	32¼	4	9⅜	2⅜	9	2	30	34½	20⅞	13⅜
70	146	41¾	33⅜	4⅛	9⅝	2½	9¼	2⅛	31⅛	35⅝	21½	13⅜
71	150	42¾	34	4⅛	9¾	2½	9⅜	2⅛	31⅞	36	21⅞	13½

BOYS
Medium Build

Hght.	Weight	Shoulder Girth	Chest Girth	Chest Expansion	Right Arm	Difference	Left Arm	Difference	Waist	Hips	Thighs	Calves
51	59	30½	24½	2¾	6¾	1	6⅝	¾	20½	25¼	15¾	10⅞
52	62	30¾	24¾	3	7	1⅛	6¾	1	21	26¼	16	11
53	64	31	25⅜	3	7⅛	1⅛	7	1	21¾	26¾	16⅜	11⅛
54	68	31¾	25¾	3	7⅜	1¼	7⅛	1⅛	22⅛	27	16¾	11¼
55	72	33¼	26	3⅛	7⅝	1¼	7⅜	1⅛	22⅞	27½	17	11⅜
56	75	33¾	26⅜	3¼	7¾	1¼	7½	1⅛	23⅜	28	17¼	11½
57	78	34⅜	26¾	3⅜	7⅞	1¼	7⅝	1⅛	23¾	28½	17⅝	11⅝
58	83	35⅜	27⅜	3⅜	8	1¼	7¾	1⅛	24⅛	29	18	11¾
59	87	35½	27⅝	3½	8⅛	1⅜	7⅞	1⅛	25⅛	29¾	18¼	11⅞
60	90	35⅞	28⅛	3½	8¼	1½	8	1¼	25¾	30⅝	18⅝	12
61	95	36⅛	28¼	3⅝	8⅜	1½	8⅛	1¼	26¼	31⅜	19	12⅛
62	100	36⅜	28⅜	3¾	8½	1⅝	8⅛	1⅜	26¾	32⅛	19½	12¼
63	106	36⅞	28⅝	3¾	8¾	1¾	8⅜	1½	27¼	32¾	19⅞	12½
64	114	37⅝	29¼	3⅞	9	2	8½	1¾	27¾	33¼	20⅛	12¾
65	120	37⅞	29⅝	3⅞	9¼	2	8¾	1¾	27⅞	33¾	20½	13
66	127	38¼	30⅛	4	9⅜	2⅛	9	1⅞	28	34½	20¾	13⅛
67	134	39	30⅝	4	9⅝	2⅛	9⅛	1⅞	28⅞	35	21	13½
68	140	40	31½	4	9⅝	2¼	9⅛	2	29½	35½	21	13½
69	148	41⅛	32⅞	4⅛	9¾	2⅜	9⅜	2	31	36⅛	21½	13⅝
70	156	42¼	34½	4⅛	9⅞	2⅝	9½	2¼	32	37	21¾	13⅝
71	163	43	35	4¼	10	2⅝	9⅝	2¼	32⅞	37¾	22	13¾

BOYS

Medium-Heavy Build

Hght.	Weight	Shoulder Girth	Chest Girth	Chest Expansion	Right Arm	Difference	Left Arm	Difference	Waist	Hips	Thighs	Calves
51	62	31¼	25⅛	2⅞	7⅛	1	6⅞	⅞	21½	26	16⅛	11
52	66	31⅝	25½	3	7¼	1⅛	7⅛	1	22	26¾	16⅜	11⅜
53	68	32	26	3	7⅜	1⅛	7¼	1	22¾	27	16¾	11⅝
54	73	32½	26⅜	3⅛	7⅝	1¼	7⅜	1⅛	23⅜	27¼	17	11¾
55	77	33⅜	26⅞	3¼	7¾	1¼	7½	1⅛	24½	28	17¼	12
56	82	34⅝	27¼	3¼	7⅞	1¼	7¾	1⅛	24⅞	29⅛	17⅝	12⅛
57	86	35⅛	27⅝	3⅜	8	1⅜	7¾	1⅛	25⅜	30	18⅛	12¼
58	91	35⅞	28	3½	8⅛	1⅜	7⅞	1¼	25⅝	30⅝	18¾	12⅜
59	94	36⅛	28⅜	3½	8¼	1½	8	1¼	26¼	31⅜	18⅞	12½
60	98	36⅝	28⅞	3⅝	8½	1⅝	8¼	1⅜	26¾	32	19¼	12½
61	103	37⅜	29¼	3⅝	8⅝	1¾	8⅜	1½	27¼	32⅝	19½	12⅝
62	109	37⅝	29¾	3¾	8¾	1¾	8⅜	1½	27⅜	33⅛	20	12¾
63	115	38½	30⅛	3⅞	9	2	8⅝	1¾	28	33⅝	20⅜	12⅞
64	122	39⅛	30¾	3⅞	9⅛	2⅛	8¾	1⅞	28⅞	33¾	20⅝	13
65	128	39½	31⅛	4	9¼	2⅛	8⅞	1⅞	29⅜	33¾	20¾	13¼
66	136	39⅝	31½	4	9½	2⅛	9	1⅞	29⅝	34¼	20⅞	13⅜
67	144	40¾	32¼	4	9⅞	2⅛	9¼	1⅞	31	35⅝	21¼	13⅝
68	157	41⅜	33¼	4⅛	10	2¼	9½	2	32⅞	37	21½	13⅝
69	163	42	34	4⅛	10¼	2⅜	9¾	2⅛	34	38½	21⅝	13⅝
70	170	43¼	35⅜	4¼	10½	2⅝	10	2¼	35⅛	39⅜	22	13¾
71	178	44	35⅞	4⅜	10⅝	2⅝	10¼	2¼	35⅝	40	22¼	14
72	186	44⅞	36⅜	4½	10⅝	2¾	10¼	2⅜	36¼	40⅝	22⅝	14⅜

BOYS

Heavy Build

Hght.	Weight	Shoulder Girth	Chest Girth	Chest Expansion	Right Arm	Difference	Left Arm	Difference	Waist	Hips	Thighs	Calves
51	65	32	26	3	7½	1⅛	7¼	1	22½	27	16½	11¼
52	69	32⅝	26¾	3	7½	1⅛	7⅜	1	23⅛	28	16¾	11¾
53	74	33	27⅛	3⅛	7⅝	1¼	7½	1⅛	23¾	28⅝	17⅛	12⅛
54	79	33¼	27⅝	3¼	7⅞	1¼	7⅝	1⅛	24¾	29	17⅜	12⅜
55	83	33⅝	27⅞	3¼	8	1¼	7¾	1⅛	25½	29½	17⅝	12⅝
56	89	35	28¼	3⅜	8⅛	1⅜	8	1⅛	26½	29⅞	18⅛	12¾
57	94	36	28⅝	3½	8¼	1⅜	8⅛	1¼	27	30⅜	18⅝	13
58	99	36⅜	29	3½	8⅜	1½	8⅛	1¼	27¼	32⅛	19½	13
59	103	36¾	29¼	3⅝	8½	1⅝	8¼	1⅜	27½	33	19⅝	13⅛
60	107	37½	29⅝	3⅝	8⅞	1⅞	8⅝	1½	27⅞	33¾	19⅞	13⅛
61	112	38⅝	30⅜	3⅝	9	2	8¾	1¾	28¼	34	20⅛	13¼
62	119	39	31⅛	3¾	9⅛	2	8¾	1¾	28⅜	34⅛	20½	13¼
63	124	40⅛	31¾	3⅞	9¼	2⅛	8⅞	1⅞	28¾	34⅛	20⅞	13⅜
64	129	40½	32¼	4	9¼	2¼	9	2	30	34¼	21⅛	13½
65	137	41	32¾	4	9⅜	2¼	9	2	30⅞	35	21⅛	13½
66	146	41½	33	4	9¾	2¼	9¼	2	32	36¼	21¼	13⅝
67	158	42½	33½	4⅛	10¼	2¼	9½	2	33⅜	38	21½	13¾
68	169	42¾	34⅜	4⅛	10½	2⅜	10	2⅛	35½	39½	22⅛	13⅞
69	180	43½	35⅝	4¼	10½	2½	10	2¼	36⅛	40½	22½	14
70	189	45	36½	4½	10⅝	2½	10¼	2¼	37¼	42	23	14⅛
71	200	45⅞	37	4⅝	10⅝	2⅝	10¼	2¼	38¼	43	24	14⅛
72	210	46½	37¾	4¾	10⅞	2⅞	10⅜	2⅜	40	44⅛	24¾	14⅜

GIRLS
Pre-Adolescent—Slender

Hght.	Weight	Shoulder Girth	Chest Girth Contracted	Chest Expansion	Upper R. Arm Girth	Difference	Upper L. Arm Girth	Difference	Waist	Hip	Average Thigh Girth	Average Calf Girth
45	41	25¾	19	1¾	6⅛	¼	6⅛	¼	18⅝	24⅝	12	8⅝
46	43	25⅞	19	1¾	6¼	¼	6⅛	¼	18¾	24¾	12	8⅝
47	46	26¼	19⅛	1¾	6⅜	¼	6⅜	¼	18⅞	24⅞	12⅛	8¾
48	48	26⅞	19⅜	1¾	6⅜	⅜	6⅜	¼	19	25⅛	12½	8⅞
49	50	27	19⅜	1⅞	6⅝	⅜	6⅜	⅜	19¼	25⅛	12¾	9⅛
50	52	27¼	19½	2	6¾	⅜	6½	⅜	19⅝	25⅜	13¼	9¼
51	53	27½	19¾	2	7	½	6⅞	½	20⅛	25⅝	13¾	9½
52	54	28¼	20	2	7	½	6⅞	½	20½	25⅞	14	9⅝
53	55	29	20¼	2⅛	7⅛	⅝	7	½	20¾	26⅛	14⅛	9¾
54	58	29¼	20⅜	2⅛	7⅛	¾	7⅛	⅝	21	26⅝	14⅝	10
55	61	29½	20½	2¼	7¼	⅞	7¼	¾	21⅛	26¾	15	10⅛
56	66	29⅞	20¾	2⅜	7⅜	1	7¼	¾	21⅜	27	15⅜	10¼
57	69	30¼	21	2½	7½	1	7⅜	⅞	21⅝	27⅜	15⅜	10¼
58	72	31	21⅛	2½	7¾	1⅛	7½	1	21⅝	28	15½	10⅜
59	76	31⅛	21⅜	2⅝	7⅞	1⅛	7½	1	21⅞	28½	15¾	10⅝
60	80	31⅜	21¾	2¾	8	1⅛	7¾	1	22⅛	29¼	16	10⅞
61	86	31¾	21⅞	2⅞	8⅛	1⅛	7¾	1	22⅜	29¾	16¼	11⅛
62	89	31⅞	22½	3	8¼	1⅛	7⅞	1	22½	30½	16½	11½
63	93	32⅜	22⅞	3	8⅜	1¼	8⅛	1⅛	22⅝	30¾	17	11½
64	100	33	23⅛	3	8½	1¼	8¼	1⅛	22⅞	31¼	17⅛	11⅝
65	104	33⅜	23⅝	3⅛	8½	1¼	8¼	1⅛	23	31⅝	17¼	11⅞

GIRLS

Pre-Adolescent—Slender-Medium

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
45	43	26	19	1¾	6¼	¼	6¼	¼	18⅝	24¾	12	8⅝
46	44	26	19⅛	1¾	6⅜	¼	6¼	¼	18¾	24⅞	12⅛	8¾
47	46	26½	19⅛	1¾	6½	⅜	6½	⅜	18⅞	25¼	12⅜	9⅛
48	49	27	19⅜	1⅞	6⅝	⅜	6½	⅜	19⅛	25⅜	12¾	9⅛
49	51	27¼	19⅝	2	6⅝	⅜	6½	⅜	19½	25½	13¼	9¼
50	54	27½	19⅞	2	6⅞	½	6¾	½	20	25¾	14	9⅜
51	56	28	20	2	7	½	6⅞	½	20¼	26	14⅛	9¾
52	58	28¾	20¼	2⅛	7⅛	⅝	6⅞	½	20½	26⅜	14½	10
53	61	29¼	20⅝	2¼	7⅜	¾	7⅛	⅝	21	26⅝	14⅝	10
54	64	29½	21	2¼	7½	⅞	7¼	¾	21¼	26¾	14¾	10⅛
55	66	29¾	21⅛	2⅜	7⅝	1	7½	¾	21¼	27	15⅛	10¼
56	69	30	21¼	2⅜	7⅞	1	7⅝	⅞	21⅝	27⅜	15½	10½
57	73	31	21⅜	2½	8	1	7¾	⅞	21¾	28	15⅝	10½
58	77	31½	21⅝	2⅝	8¼	1⅛	8⅛	1	21¾	28½	15⅝	10½
59	81	31⅞	21⅞	2¾	8¼	1⅛	8⅛	1	22	28¾	16	10¾
60	85	32¼	22	2⅞	8⅜	1⅛	8¼	1	22¼	29⅝	16⅝	11⅛
61	89	32½	22¼	3	8½	1⅛	8¼	1	22¾	30⅜	16¾	11½
62	94	32⅞	23¼	3	8⅝	1⅛	8⅜	1⅛	22⅞	31	17	11¾
63	98	33¼	24	3⅛	8⅞	1¼	8½	1⅛	23	31⅜	17¼	12
64	103	33¾	24¾	3⅛	9	1¼	8¾	1⅛	23¼	32	17⅝	12¼
65	108	34¼	25¼	3⅛	9⅛	1⅜	8⅞	1¼	23¾	32	18	12⅜
66	112	35⅞	27	3¼	9⅛	1⅜	8⅞	1¼	23⅞	33	18¼	12½

GIRLS
Medium—Pre-Adolescent

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
45	44½	26½	19⅛	1¾	6⅜	¼	6¼	¼	18¾	25⅛	12⅛	9⅛
46	46	26¾	19¼	1¾	6⅜	⅜	6¼	⅜	18¾	25⅜	12¼	9⅜
47	48	27	19¼	1¾	6⅝	⅜	6½	⅜	18¾	25½	12⅜	9½
48	51	27½	19½	2	6¾	⅜	6⅝	⅜	19¼	25½	12⅜	9½
49	53	27¾	19¾	2	7	⅜	6¾	⅜	19¾	25¾	13	9⅝
50	57	28⅜	20	2	7	½	6¾	½	20½	26	14¼	9¾
51	59	28¾	20⅜	2⅛	7⅛	½	7	½	20¾	26⅜	14½	10
52	62	29¼	20⅝	2⅛	7¼	⅝	7⅛	½	21¼	26¾	14⅞	10⅛
53	65	29⅝	20⅞	2¼	7½	⅞	7¼	¾	21½	27	15¼	10¼
54	67	29⅞	21⅜	2½	7⅝	1	7⅜	⅞	21⅝	27¼	15½	10⅜
55	70	30¼	21¾	2½	7⅝	1	7⅜	1	21¾	27⅝	15⅝	10⅝
56	73	30⅞	22	2½	8	1	7⅝	1	22	28	15¾	10⅝
57	77	31⅜	22¼	2½	8	1⅛	7⅝	1	22¼	28¼	15⅞	10⅝
58	80	31⅞	22⅜	2¾	8⅛	1⅛	8⅛	1⅛	22¾	28¾	16¼	10¾
59	84	32¼	22½	3	8¼	1¼	8⅛	1⅛	23	29¼	16½	11
60	92	32⅝	22¾	3	8½	1¼	8¼	1⅛	23	30¼	16¾	11⅜
61	96	32⅞	23	3⅛	8⅝	1¼	8⅜	1⅛	23⅜	30¾	17	11⅝
62	99	33¼	23½	3⅛	8¾	1¼	8½	1⅛	23¾	31⅜	17¼	12
63	104	33⅞	24¼	3⅛	9	1⅜	8¾	1⅛	23⅞	31⅞	17½	12⅛
64	108	34⅛	25	3⅛	9⅛	1⅜	8⅞	1⅛	24	32¼	17⅞	12⅜
65	113	34¾	25⅞	3⅛	9¼	1⅜	9	1¼	24⅛	33	18⅛	12½
66	122	36⅛	27¼	3¼	9⅜	1½	9¼	1¼	24½	34	18½	12¾

GIRLS
Pre-Adolescent—Medium-Heavy

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
44	43	26	19	1½	6¼	¼	6¼	¼	20	25¼	12¼	9
45	46	26½	19⅜	1½	6¼	⅜	6¼	⅜	20	25½	12½	9¼
46	49	27	19¾	1¾	6½	⅜	6⅜	⅜	20¼	25¾	12⅝	9½
47	52	27¾	20	2	6¾	⅜	6⅝	⅜	20½	25¾	12⅞	9¾
48	54	28½	20¼	2	6⅞	½	6⅞	⅜	20¾	26	13⅛	10
49	58	29¼	20½	2	7⅛	⅝	7	½	20¾	26½	13¾	10⅛
50	62	29¾	20⅞	2⅛	7⅛	⅝	7	½	21	26¾	14½	10⅜
51	66	30	21¼	2¼	7½	⅞	7¼	⅝	21⅛	27⅛	15	10½
52	68	30½	21½	2⅜	7⅝	1	7⅜	⅞	21¾	27½	15⅜	10¾
53	72	30¾	21⅞	2½	7⅞	1	7⅝	⅞	22¼	27¾	16	10¾
54	74	31	22⅛	2⅝	7⅞	1⅛	7⅝	1	22½	28	16⅜	10⅞
55	76	31¼	22⅜	2¾	8⅛	1⅛	7⅞	1	22¾	28¼	16⅝	11
56	80	31¾	22½	2⅞	8¼	1⅛	8	1	23	28¾	16¾	11⅛
57	84	32¼	22¾	3	8½	1¼	8¼	1	23	29	16¾	11⅛
58	87	32½	22⅞	3⅛	8⅞	1¼	8½	1⅛	23¼	29¾	17¼	11⅜
59	92	33	23¼	3⅛	9	1⅜	8¾	1⅛	23⅝	30⅛	17½	11⅞
60	98	33¼	23⅜	3¼	9¼	1⅜	8⅞	1⅛	23¾	31⅜	17¾	12¼
61	106	33½	23¾	3⅜	9⅜	1⅜	9	1⅛	24⅛	31⅞	18⅛	12¼
62	110	34	24⅛	3½	9½	1½	9	1⅛	24¼	32	18⅜	12⅜
63	115	34½	24⅝	3½	9½	1½	9⅛	1¼	24¼	32⅝	18⅞	12⅝
64	119	34¾	25⅞	3½	9¾	1⅝	9⅜	1⅜	24½	33	19⅛	12⅞
65	124	35½	26¾	3⅝	9⅞	1⅝	9½	1⅜	24¾	34¾	19⅜	13⅛
66	129	36¼	27⅞	3⅝	10	1⅝	9½	1⅜	24¾	35	19⅝	13¼

GIRLS

Pre-Adolescent—Heavy

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
44	48	26½	19¼	1¾	6½	⅜	6½	⅜	20	25¾	13	9½
45	51	26⅞	19¾	1¾	6⅞	½	6⅞	½	20⅛	26¼	13¾	9⅞
46	54	27½	20⅜	2	7	½	7	½	20⅜	26⅝	14½	10⅜
47	59	28¼	20¾	2	7⅛	½	7	½	21	26¾	15	10¾
48	65	29	21	2⅛	7⅜	⅝	7¼	½	21¼	27	15⅝	11
49	68	29⅜	21¼	2⅛	7½	⅝	7⅜	⅝	21½	27¼	16	11⅛
50	72	30	21⅝	2¼	7⅝	¾	7½	⅝	21⅞	27⅝	16¼	11⅜
51	74	30½	21⅞	2⅜	7⅞	1	7¾	⅞	22¼	28	16⅝	11⅜
52	78	31	22	2⅜	8⅛	1	8	⅞	22½	28¼	16¾	11½
53	81	31½	22½	2½	8½	1⅛	8¼	1	22¾	28½	17	11⅝
54	83½	32	23⅛	2⅝	8¾	1⅛	8⅝	1	22⅞	28¾	17¼	11⅝
55	86	32½	23⅝	2¾	8⅞	1⅛	8⅝	1	23	29	17½	11¾
56	91	33⅛	24	3	8⅞	1¼	8⅝	1⅛	23⅛	29⅜	17¾	11¾
57	96	33⅜	24½	3⅛	9	1¼	8¾	1⅛	23¼	29¾	17⅞	11⅞
58	99	33¾	25	3⅛	9⅛	1⅜	8¾	1⅛	23½	30⅛	18	12
59	104	34	25¼	3¼	9¼	1⅜	9⅛	1¼	24	31½	18¼	12⅛

GIRLS

Post-Adolescent—Slender

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
61	90	32⅞	22¾	2⅞	8⅛	1⅛	8	1	23	30¾	16½	11¼
62	94	33¼	24¼	3	8½	1⅛	8¼	1	23¼	31½	16⅞	11⅝
63	98	33⅜	24¾	3	8⅝	1¼	8⅜	1⅛	23⅜	31⅞	17⅜	11⅞
64	101	33½	25	3⅛	8¾	1¼	8½	1⅛	23⅜	32¼	17¾	12
65	107	34	25¼	3¼	8¾	1¼	8½	1⅛	23⅞	32¾	18¼	12¼
66	112	35	26⅛	3¼	8⅞	1⅜	8¾	1¼	24¼	33⅜	18⅜	12½
67	118	35½	27	3½	9	1½	8¾	1⅜	24½	33⅞	18½	12⅝

GIRLS

Post-Adolescent—Slender-Medium

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
61	94	33⅝	23⅝	3	8⅜	1⅛	8¼	1	23¼	31⅜	17	11⅜
62	98	34⅜	24⅝	3	8¾	1⅛	8½	1	23⅝	32	17⅝	11⅞
63	104	34½	25	3⅛	8¾	1¼	8½	1⅛	24	33	18	12⅛
64	107	34⅝	25⅞	3¼	8⅞	1⅜	8⅝	1¼	24⅛	33½	18⅝	12⅜
65	112	35¾	26⅛	3¼	9	1⅜	8¾	1¼	24⅛	34¾	19	12¾
66	117	36¼	27¼	3½	9⅛	1⅜	8⅞	1¼	24½	35½	19⅜	12⅞
67	122	36¾	27¾	3½	9¼	1½	9	1⅜	24⅞	36¼	19⅝	13⅛

GIRLS
Post Adolescent—Medium

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
60	93	33⅝	23⅞	3	8⅜	1¼	8¼	1⅛	23¼	31⅜	17⅜	11⅜
61	97	34½	24⅞	3⅛	8⅞	1¼	8⅝	1⅛	23½	32	18⅛	12⅛
62	103	35½	25¾	3⅛	8⅞	1¼	8⅝	1⅛	24	33	18⅝	12⅛
63	110	35⅞	26⅜	3¼	9	1⅜	8¾	1⅛	24¼	33½	19	12½
64	116	36¼	27	3¼	9¼	1½	9	1¼	24½	34⅛	19⅝	12¾
65	119	36⅝	27⅜	3⅜	9⅜	1½	9⅛	1¼	24¾	35⅛	20	13
66	123	37	28	3⅜	9⅜	1½	9¼	1¼	25	36¼	20¼	13¼
67	127	37¼	28¼	3⅜	9⅜	1⅝	9¼	1¼	25½	37	20½	13⅜

GIRLS

Post Adolescent—Medium-Heavy

Hght.	Weight	Shoulder Girth	Chest Girth Con-tracted	Chest Expan-sion	Upper R. Arm Girth	Differ-ence	Upper L. Arm Girth	Differ-ence	Waist	Hip	Average Thigh Girth	Average Calf Girth
57	86	31½	22⅞	3	8½	1¼	8¼	1⅛	23	31	17⅛	11½
58	92	33	23½	3⅛	8¾	1⅜	8½	1¼	23¼	32	17⅜	11¾
59	96	34	24⅛	3⅛	9	1⅜	8¾	1¼	23⅝	32¼	17⅞	12
60	101	34½	24⅝	3⅜	9¼	1⅜	9	1¼	23⅞	32½	18⅛	12¼
61	107	35	25½	3⅜	9⅜	1⅜	9⅛	1¼	24⅜	33	18½	12½
62	114	35⅞	26⅛	3½	9⅜	1½	9¼	1¼	24½	33½	19½	12⅞
63	120	36¼	27	3½	9½	1½	9¼	1¼	25¼	34¼	19⅞	13
64	125	36¾	27¾	3½	9¾	1⅝	9⅝	1⅜	25¼	35	20⅜	13¼
65	129	37	28	3⅝	9⅞	1⅝	9⅝	1⅜	25½	36	20¾	13½
66	135	37⅜	28⅛	3⅝	10	1⅝	9¾	1⅜	26	37	21	13¾

GIRLS

Post-Adolescent—Heavy

Hght.	Weight	Shoulder Girth	Chest Girth Contracted	Chest Expansion	Upper R. Arm Girth	Difference	Upper L. Arm Girth	Difference	Waist	Hip	Average Thigh Girth	Average Calf Girth
59	105	34½	25¼	3½	9⅜	1⅜	9¼	1¼	23½	32½	19⅛	12⅞
60	110	35	25⅜	3½	9⅜	1⅜	9¼	1¼	23¾	32⅞	19¾	13
61	116	35½	25¾	3½	9½	1⅜	9⅜	1¼	24⅝	33¼	20¼	13⅛
62	120	36¾	26⅜	3½	9½	1½	9⅜	1⅜	25	34	20½	13¼
63	127	37	27⅛	3⅝	9⅝	1⅝	9½	1⅜	25½	34¼	20¾	13½
64	133	37¼	28	3⅝	9⅞	1⅝	9¾	1⅜	25¾	35¾	21	13⅝
65	140	37½	28¼	3⅝	10⅛	1⅝	9¾	1⅜	26⅜	36⅞	21¼	13¾
66	149	37⅞	28⅜	3¾	10¼	1¾	10	1½	27¼	38	21½	14
67	158	38½	28½	3¾	10¼	1¾	10	1½	28	39	21¾	14⅜
68	169	38¾	28¾	3¾	10⅜	1¾	10⅛	1½	28¼	39¾	22	15

DIRECTIONS FOR SCORING

The measuring should come after a medical examination. A child that is not in good condition cannot be expected to make his or her real score.

The measuring is done in pounds and in inches, so that a pair of scales and some means for measuring height will be needed, as well as a good tape—preferably steel.

Remember again that in measuring the tape must not be pulled tightly. It must not compress the flesh. A very slight pull is enough to hold it in position. Great care must be taken to cultivate the habit of measuring in this fashion.

Read previous directions as to the different measurements carefully, and when the measurements are taken score as follows: Begin with 100. Add to 100 or subtract from it according to whether each measurement is above or below standard. With shoulder-girth, chest-girth (after exhalation), upper arm girth and thigh-girth ¼ inch counts 1. With chest-expansion and contraction-difference of upper arm ⅛ inch counts 1. For boys, with hips and thighs ½ inch counts 1, and with girls 1 inch counts 1. Do not use fractions less than ½ a point.

The examining physician should report as to which class a girl belongs—pre-adolescent or post-adolescent.

In making comparisons with the tables, find on which table there is a weight nearest to that of the boy or girl for the same height. Should the subject's weight come squarely between two weights, then compare with that of the more slender type.

The making up of scores and keeping of the records is simplified if the regular standard form is used. This places the measurements of the boy or girl on one line, and below it the standard for the same height and weight, and below that the results of the comparisons between the subject's measurements and the standard—the "plusses" and "minuses" so to speak. It is easy then to sum up the plusses and minuses and add the result to the 100.

APPENDIX

In a Brooklyn, N. Y., public school were 73 boys 13 years old in the 5th, 6th, 7th and 8th grades. Each grade was, as is usual, divided into two sections a half-year apart, termed 5A, 5B, 6A, 6B, etc. These boys were measured according to the height-weight system, their scores found, and correlated with their grade standing. The co-efficient of correlation was .454 and the probable error .0627.

The grade scores were as follows:

8B 100, 8A 90, 7B 87.3, 7A 85.4, 6B 83.5, 6A 80.3, 5B 80.3, 5A 78.4.

The above shows clearly to those not acquainted with "coefficients of correlation" how steadily the physical score improved with the school grade for boys of the same age. In other words, there seemed to be some relation between mental and physical efficiency.

A few years ago 159 boys in the Speyer School, an experimental school run jointly by Teachers College and the Public School System of New York, were given their physical standards. These boys entered in the same grade, but were ranked according to intelligence, after the most painstaking testing on the part of experts. These boys were grouped in 7 classes, with the brightest in No. 1. The 7 classes had the following physical scores as class averages:—

1 = 95.1, 2 = 93, 3 = 85.5, 4 = 89.2, 5 = 82.7, 6 = 80.2, 7 = 80.9.

In other words, there was a difference, even in the same grade, when boys of a different grade of intelligence were scored physically.

One more example—this from the Singerley (public) school of Philadelphia. At the time of measuring there were 67 boys 13 years old in the grades from 5 A to 8 B, inclusive. The average of the physical scores for each grade were as follows:—

8th Grade 95, 7th 93.1, 6th 86.9, 5th 86.7.

If, then, there is a relationship between mental and physical efficiency, having a requisite muscular strength is more important than many of us have thought. It means more to a boy or girl, evidently, than mere athletic ability!

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